

Case Report

Unusual right internal jugular vein catheter malposition into the right axillary vein: A rare case report

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Abstract One of disastrous complications of central venous cannulation (CVC) is malposition of central venous catheter. In this case report, we present an adult patient with history of multiple trauma and intracranial hemorrhage in whom the right axillary vein was accidentally cannulated during CVC insertion.

Key Words: Central venous cannulation, malposition of central venous catheter, right internal jugular vein, right axillary vein

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INTRODUCTION

There are several anatomic access points for cannulation of central veins. Cannulation from the upper body is generally more common. It is due to less contamination of upper body sites. Since the upper body is used more generally, the incidence of mal-positioning of central venous cannulation (CVC) is also more prevalent. One of rare form of these CVC mal-positionings is right axillary vein that presents in this case report.

CASE REPORT

A 60-year-old man presented with intracranial hemorrhage secondary to multiple trauma that



Figure 1: Conventional chest radiograph with abnormal position of the tip of central venous catheter. (a) before pulling back the catheter, (b) after pulling back the catheter. Point a = the tip of catheter that seems is in axillary vein. Point b = the part of catheter which seems is outside axillary vein

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was treated under mechanical ventilation due to respiratory failure. He was candidate for cannulation of internal jugular vein (IJV) due to unavailability of peripheral veins.

Cannulation of right IJV was performed via a central approach after preparing and draping. The procedure was performed without any significant problem. After IJV cannulation, chest X-ray was done [Figure 1].

In retrospect, the nearly symmetrical chest X-ray [Figures 1a and 1b] illustrated an unusual position of the central line: Deviation of the catheter to the lateral and the apparent position of the tip into right axillary vein.

For confirmation of axillary vein cannulation, guide-wire was inserted antegradely and the final position of catheter traced clinically. It was documented that the catheter was inserted into the right axillary vein. Interestingly, there was no problem for infusion of fluids via catheter. However, we removed the catheter without further complications and IJV cannulation was performed successfully via left.

DISCUSSION

Insertion of the central venous catheter has some complications that are mostly arterial puncture, pneumothorax and hematoma which are presented mostly during insertion of a catheter. Mark and colleagues^[1] reported an incidence of axillary vein malposition of 14% and showed that clinical factors alone will not consistently recognize malpositioned catheters. Fortunately, we had no adverse complication.

As reported data showed, there was an extremely wide range of catheter malposition from less than 1% to more than 60%. Malatinsky and colleagues^[2] reported 5.3% incidence for malpositioning and coiling with 30% incidence for external jugular vein. Paw^[3] reported that the incidence of malpositioning following catheterization via the left IJV was more than the right IJV. Muhm *et al.*^[4] reported respective incidence of 4.12% for the left internal jugular access and 1.1% for the right internal jugular. Pikwer and colleagues^[5] reported the total incidence of radiographic catheter tip malposition which defined as extrathoracic or ventricular positioning was 3.3% with confidence interval 25% to 4.3%. They reported that cannulation by the right subclavian vein had the highest risk of malposition with the incidence of 9.1% compared with 1.4% by the right IJV. In a systematic review performed by Ruesch *et al.*,^[6] it was reported that catheter malposition rates was 5.3% and 9.3% for IJV and subclavian vein catheterization, respectively.

For confirmation of malpositioning of the catheter, we inserted guide-wire into catheter as a radio-opaque material to make the catheter more visible in chest X-ray. It was preferable that we confirmed malpositioning of CVC by contrast agents but it was unavailable at that time and we were obligated changing the position of the catheter as soon as possible. However, we did this procedure very carefully and had no complication.

In Figure 1a it is shown that the tip of the catheter (point a) is in the axillary vein. The part of catheter that is external to the axillary vein seems going over the acromion (point b). Also, in Figure 1b, the external part of the catheter seems to be going over the acromion. The comparison of two figures shows the part of catheter which is outside of the axillary vein and going over the acromion is approximately without displacement despite of pulling back the tip of catheter. This confirms the extra-venous position of catheter that going over near the acromion. We didn't pullback the catheter with guide-wire in it.

The deep system of the upper extremity veins is composed of paired veins (ulnar, radial, and interosseous) which are located underneath the elbow.^[7] Subsequently, these construct the paired brachial veins that connect the basilic vein to form the axillary vein. The axillary vein keeps on as the subclavian. After that, the subclavian vein links to the IJV to form the brachiocephalic veins.

At the left side, the brachiocephalic crosses the midline and subsequently joins to the right brachiocephalic vein and form the superior vena cava.^[8] The venous anatomy of the upper extremity has greater variability compared with the lower extremity. There are more inter-individual difference in the number of venous branches and their respective lengths in the upper extremity.^[9]

For prevention of the adverse effect of CVC insertion via IJV, some authors recommended the use of ultrasound-guidance.^[10] Nevertheless, in a prospective randomized trial, Mansfield and colleagues^[11] showed no difference in prevention of iatrogenic cannulation using ultrasound guidance.

In our center, insertion of a central venous catheter is usually performed without the use of ultrasound guidance. The above findings emphasize taking routine chest radiograph to confirm appropriate catheter tip position in the superior vena cava.

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